

What is Claimed is:

1. A method for producing polymer-based microcapsules or nanocapsules comprising:
 - (a) dissolving a biocompatible, biodegradable
5 polymer in a solution comprising a sublimable substance and an oil phase;
 - (b) forming an emulsion of large capsules of mixed polymer and sublimable substance in the solution;
 - (c) pouring the emulsification into a surfactant
10 solution to break-up the polymer/sublimable substance capsules into smaller capsules;
 - (d) removing the oil phase from the capsules, causing the capsules to shrink further in size to microcapsules and nanocapsules; and
15 (e) washing and collecting the microcapsules and nanocapsules.
2. A method for producing polymer-based microcapsules or nanocapsules comprising:
 - (a) dissolving a biocompatible, biodegradable
20 polymer in a solution comprising a sublimable substance and an oil phase;
 - (b) adding ammonium carbonate to the solution of step (a);
 - (c) sonicating the solution of step (b) to form a
25 first emulsion;
 - (d) pouring the first emulsion of step (c) into a surfactant solution;
 - (e) homogenizing the solution of step (d) to form a second emulsion;
 - 30 (f) pouring the second emulsion of step (e) into water and stirring to produce polymer-based microcapsules and nanocapsules; and
 - (g) collecting and washing the produced polymer-

based microcapsules and nanocapsules of step (f).

3. A microcapsule or nanocapsule produced in accordance with the method of claim 1 or 2.

4. A contrast agent for diagnostic imaging in a patient comprising microcapsules or nanocapsules of claim 3 filled with a gas.

5. The contrast agent of claim 4 further comprising a targeting agent attached to an outer surface of the microcapsules or nanocapsules.

6. A method for imaging a tissue or tissues in a subject comprising administering to the subject the contrast agent of claim 4.

7. A method for selectively imaging a tissue or tissues in a subject comprising administering to the subject the contrast agent of claim 5.

8. The method of claim 7 wherein the contrast agent selectively targets diseased tissue and distinguishes the diseased tissue from normal tissue.

9. The method of claim 7 wherein the contrast agent selectively targets malignant tissue and distinguishes the malignant tissue from benign tissue.

10. A composition for delivery of a bioactive agent comprising a microcapsule or nanocapsule of claim 3 and a bioactive agent adsorbed to, attached to, or encapsulated in, or any combination thereof, the microcapsule or nanocapsule.

11. The composition of claim 10 further comprising a targeting agent attached to an outer surface of the microcapsule or nanocapsule.

12. A method for delivering a bioactive agent to
5 a subject comprising administering to the subject the composition of claim 10 and triggering release of the bioactive agent in the subject by ultrasound.

13. A method for delivering a bioactive agent to a subject comprising administering to the subject the
10 composition of claim 10 wherein bioactive agent is released by degradation of the polymer-based microcapsule or nanocapsule.

14. The method of claim 13 wherein degradation of the polymer-based microcapsule or nanocapsule and
15 release of the bioactive agent is altered by ultrasound.

15. A method for targeting a bioactive agent to a selected tissue in a subject comprising administering to the subject the composition of claim 11.

16. The method of claim 15 wherein the
20 composition is targeted to diseased tissue.

17. The method of claim 15 wherein the composition is targeted to malignant tissue.

18. A method for enhancing delivery of a
25 nanocapsule to a selected tissue via holes in vasculature too narrow for access via larger microcapsules comprising administering the nanocapsule to a subject and exposing the subject to ultrasonic waves which force the nanocapsule through holes in the

vasculature.

19. A method for enhancing delivery of a nanocapsule to a selected tissue via holes in vasculature too narrow for access via larger
- 5 microcapsules comprising administering a nanocapsule of claim 3 to a subject and exposing the subject to ultrasonic waves which force the nanocapsule through the holes in the vasculature.